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September 9, 2003

Mr. Lloyd Godard
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REVIEW OF RESPONSE TO COMMENTS ON WORK PLAN ADDENDUM ONE FOR MISSION TRAILS EQUESTRIAN CENTER, EAST ELLIOT, CAMP ELLIOTT, SAN DIEGO, CALIFORNIA

Dear Mr. Godard:

The Department of Toxic Substances Control (DTSC) has reviewed the "Response to Comments" (RTC) dated August 14, 2003 on the Draft Work Plan Addendum (Addendum) dated August 30, 2002. The Addendum describes a proposed Unexploded Ordnance (UXO) support procedure and equipment to be used for the construction activities for an Equestrian Center at the Mission Trails Regional Park, Camp Elliott. The RTC included the Interim quality Assurance Audit Evaluation on Global Mapping System's Digital Geophysical Survey. Upon review, DTSC finds its comments were adequately responded to and has no further comment on the Addendum.

Please note that this concurrence is for the Removal Action at the proposed Equestrian Center (12 acres) as described in the Addendum and not for the Draft Work Plan dated February 11, 2002.

If you have any questions, please contact Ms. Katherine Leibel, Project Manager at (714) 484-5446.

Sincerely,

Shelia Lowe

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Interim Quality Assurance Audit Evaluation

On

Global Mapping System's Digital Geophysical Survey

For the

OE Construction Support Project

At the

City of San Diego's Construction Site

Mission Trails Equestrian Staging Area

Located on the

Formerly Used Defense Site (FUDS)

Camp Elliot-East Elliot (J09CA006703)

Mission Trails Regional Park, San Diego CA

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For the

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July 28, 2003

Table of Contents

List of Figures

List of Tables

1.0 Introduction

A Government Quality Assurance Audit was performed on the Digital Geophysical data for the Mission Trails Equestrian Center. The site is approximately 12 acres and is located in Mission Trails Regional Park, Camp Elliot-East Elliot (J09CA006703), San Diego, CA. The general objective of the geophysical investigation was to efficiently locate buried UXO for removal and proper disposal while complying with applicable laws, regulations, and sound technical practices. Detection objectives for the site were as follows: 1 foot for 37mm projectiles and 2.5 feet for 75mm projectiles. The data coverage objectives are 100% coverage of the site at 2.5 foot lane spacing, excluding some environmentally sensitive and inaccessible areas. This report documents the specific processes used to ensure that the product delivered by the contractor meets the project's Data Quality Objectives as outlined in the Task Order.

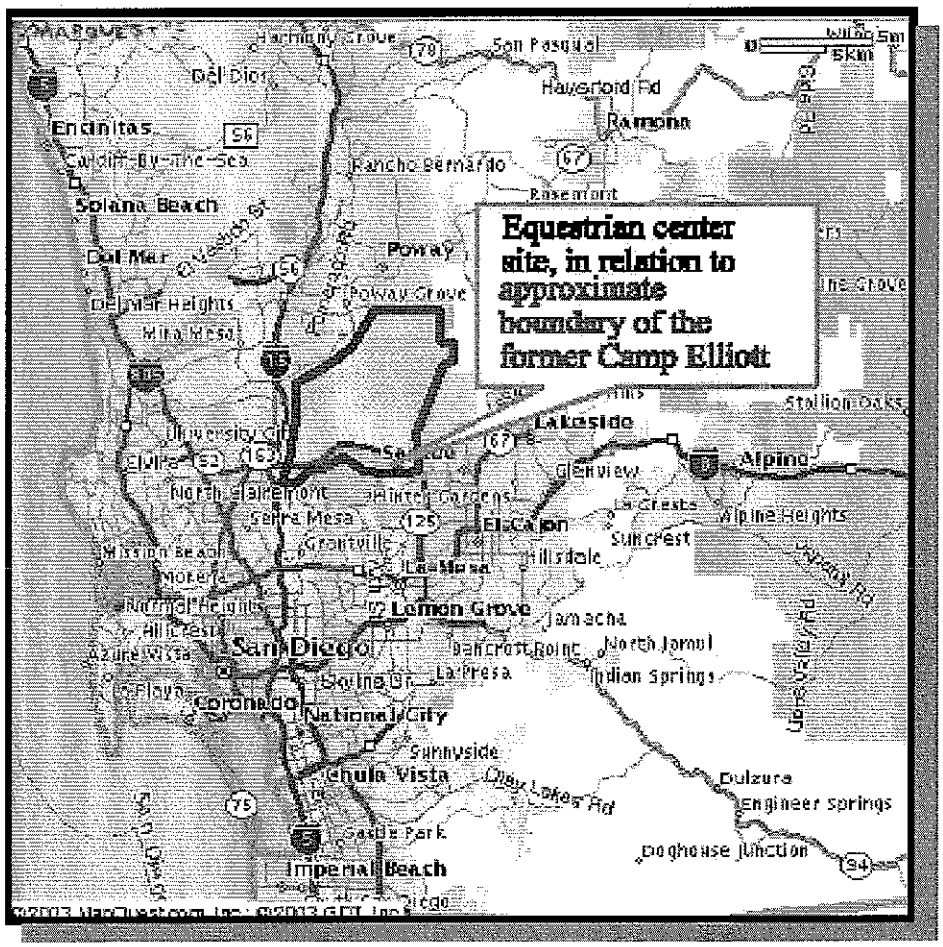

Figure 1: Site Map

2.0 Quality Assurance Audit Elements

This Government Geophysical Quality Assurance Inspection Audit provides a documentable process that effectively monitors the contractor's performance in the areas of geophysical data acquisition, processing and interpretation. Geophysical data was delivered by CD from Global Mapping Service to Huntsville Center (CEHNC) personnel on April 16, 2003. Also on the CD were Daily Activity Reports, QC logs, photos of fieldwork, site maps, GIS data, and a reacquisition spreadsheet. The documentation is very good, with informative headers with each data file.

2.1 Geophysical Test Strip Results

A test strip was emplaced by the Contractor in accordance with the Work Plan and the following diagram.

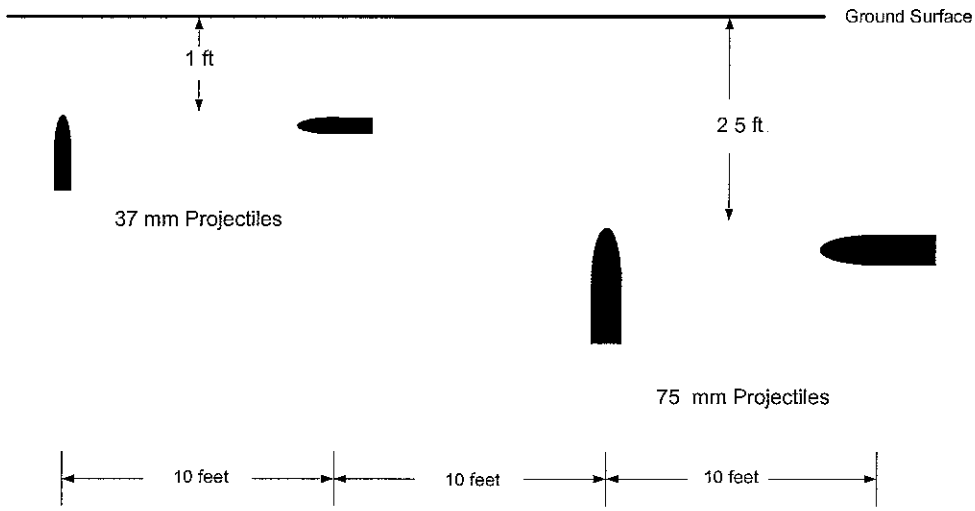

Figure 2: Test Strip Schematic

This test strip was run every day with the EM61 MK2, and an example profile plot is shown below.

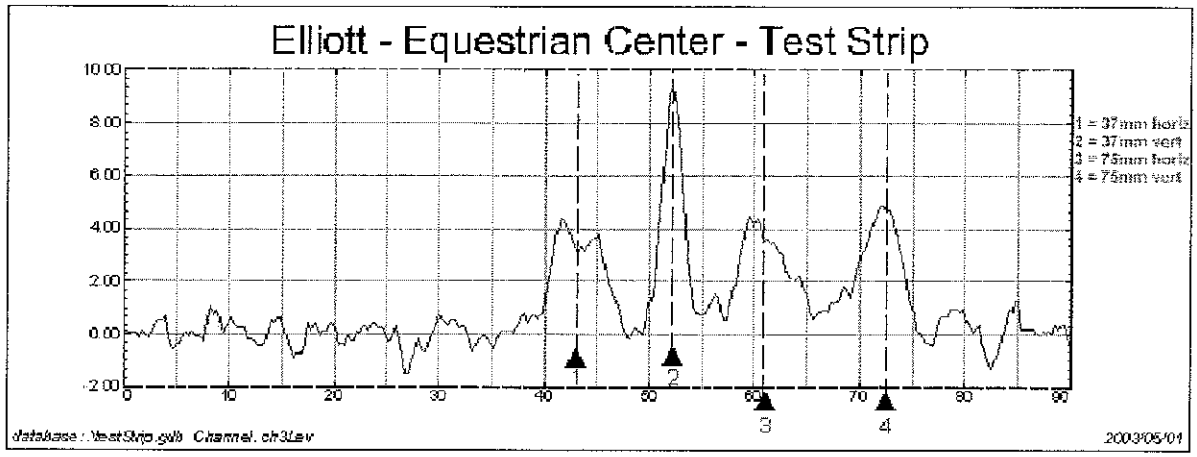

Figure 3: Test strip profile plot (vertical scale is Channel 3 reading in mV

Upon Government review of the data, it was determined that the seed item locations originally submitted by the contractor were possibly inaccurate. An Interim QA Report was sent to the project PM by email on May 1, 2003 including this concern. The following is the comment addressed in the interim QAR, and the resolution received on May 18, 2003:

***QA Comment*:** The seed item locations for the test strip appear to be inaccurate based on the responses seen on the attached profile plot. The higher amplitude, sharper peak response seen for seed item 2 is more consistent with a vertical orientation than horizontal. Likewise, the double peak response evident in seed item 1 is more consistent with a horizontal orientation.

Response from GMS: *The order and orientation of the seed items in the test strip were transmitted incorrectly. The correct position and orientation of the test strip items is shown in the attached Teststripfinal.shp and Teststrip1.pdf files.*

The correct order of the seed items listed from Southwest to Northeast is as follows.

1. *37mm Horizontal*
2. *37mm Vertical*
3. *75mm Horizontal*
4. *75mm Vertical*

Based on the results from the test strip and noise levels, the contractor picked targets on the EM61MK2 time gate 3 with a threshold of 4mV.

2.2 Quality Control Test Results

A portion of the quality control (QC) test data was checked for compliance with established acceptance criteria. Some of the QC static test data does not meet the acceptance criteria of 2.5 mV of noise (e.g. file 012703c); however, the geophysical mapping data does not appear to be adversely affected. These noise

levels may lead to more target digs than necessary. In the future, the contractor should be more careful of getting outside of tolerance.

2.3 Government Review of Digital Geophysical Mapping Data

Digital data was checked for location accuracy, latency corrections, leveling corrections, proper filtering and thresholding. Below is a map of the data processed by the CEHNC geophysicist, and based on the information in the original CD submission.

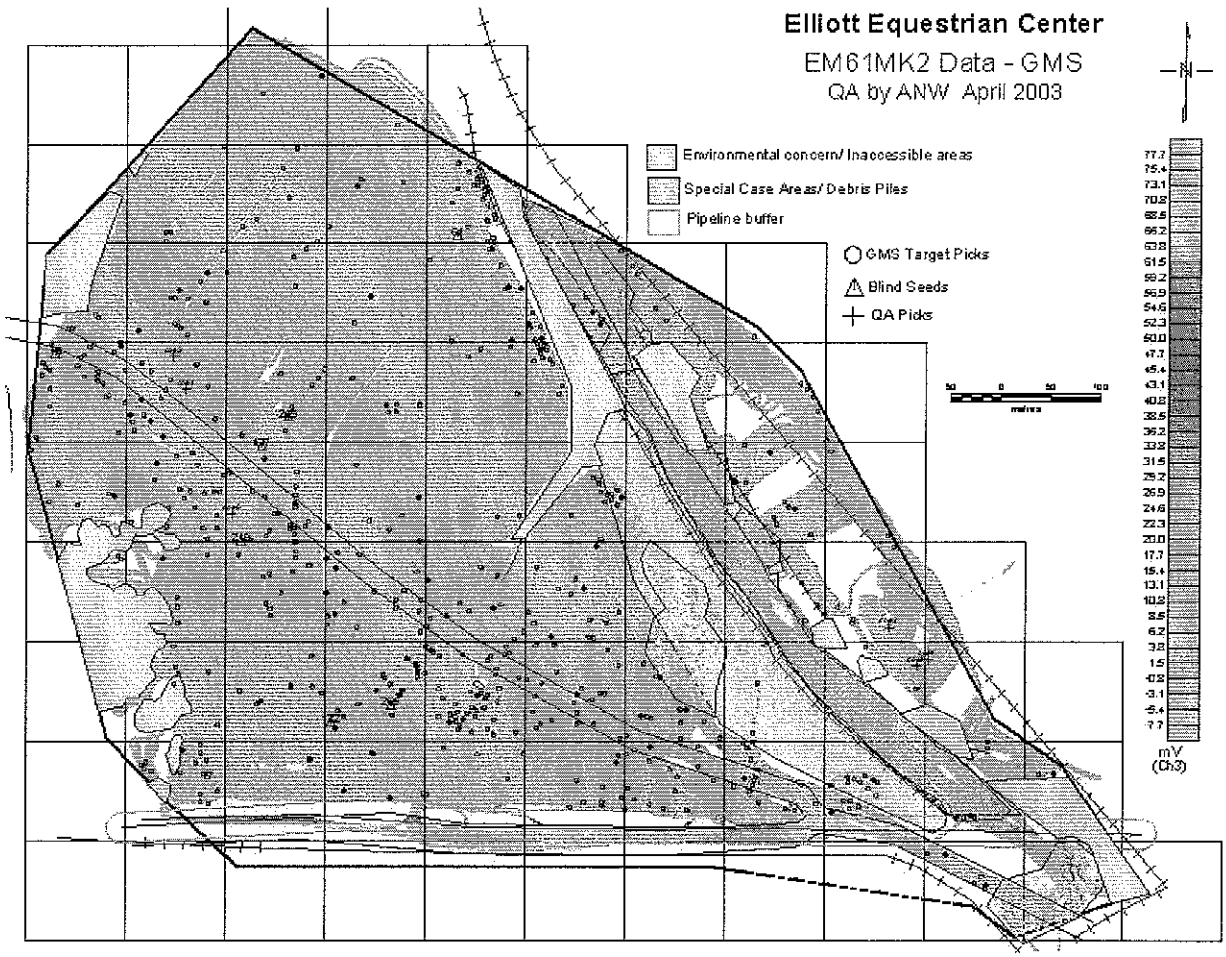

Figure 4: Geophysical Data Map (from original exclusion area Shape Files)

From this review, the overall data quality, noise levels and navigation look good. An Interim QA Report was sent to the project PM by email on May 1, 2003. The following are the problems/concerns relating to Geophysical Mapping Data that were addressed in the interim QAR, and their resolutions received on May 18, 2003:

(1) ***QA comment:*** There appears to be large areas of missing data. Attached is a data map, the blue areas are known environmental concern/inaccessible/special case areas and the white is data gap areas (large areas on the east side and south of the pipeline). The data gaps (white areas) could be caused by several factors: (1) the

areas are inaccessible or environmentally sensitive and removed from the geophysical coverage area, (2) the data was collected, but not transmitted on the data CD, or (3) the data was not collected and is still needed to meet project objectives. It is entirely possible that I don't have complete information on which areas were to be mapped and that the first alternative is the correct one.

Response from GMS: *The area south of the pipeline was not geophysically mapped for the following reasons. The southern site perimeter is located within a posted environmentally sensitive area. The Northern boundary of the environmentally sensitive area is fenced using telephone poles and connected with steel strapping material. The short distance between the pipeline buffer and the southern fence restricted the area that could be surveyed from a geophysical and in many cases, a physical standpoint. The exclusion of these areas was discussed with the USACE Safety Specialist, USACE Biologist and Prime Contractor prior to designating the area as not mappable. The attached ArcView shapefiles (Enviro_fnl_v3 shp and Brush_terrain_fnl_v2 shp) have been provided to exclude this area*

Data gaps identified in the Southwest corner of the project area are a result of using the incorrect environmental shapefile. The corrected shapefile (Enviro_fnl_v3. shp) has been provided to accurately display the environmentally sensitive areas in this region.

The areas that were not mapped between the Special Case Areas and the Northern boundary were excluded due to a combination of factors. These factors included concentrations of Pacific Coastal Sage, construction debris, and terrain that was both hazardous and would yield unreliable geophysical data.

Concentrations of Pacific Coastal Sage were identified throughout the project area by the USACE Biologist assigned to the project. After discussions with site personnel, it appears that the USACE Biologist flagged areas on the North Slope as environmentally sensitive while the geo team was mapping in this area. These areas were not reported to the GMS surveyor for mapping. The geo mapping crew avoided the area due to the flags. The flags were then removed by the Biologist, (possibly because he changed his mind) but the area was not collected. A miscommunication between GMS and the Biologists may have been the reason for a number of these data gaps. It is recommended that the USACE Biologist be available to resolve these areas when GMS provides cleanup of the data gaps.

To resolve existing data gaps, GMS plans to mobilize and collect the missing data at least 3 days prior to the reacquisition/anomaly investigation event, at no additional cost to the government. It is recommended that the USACE Biologist be available at this time to resolve areas located on the North slope.

(2) ***QA comment:*** There are also numerous data gaps caused when the lane spacing objective of 2 5 feet is not being met. This could become a significant issue if 37mm's are found during intrusive work. Because of their small size, they could easily be missed with the larger lane spacing. It may be less significant if no OE is found during the initial intrusive work.

Response from GMS: *GMS concurs with Ms. Walker. The data gaps that have been identified as a result of lane spacing are missed coverage. This may be a result of blanking distance, GPS antenna tilt and some missed cleanup. GMS will map and process the remaining data gaps prior to the reacquisition/anomaly investigation event as explained previously. An initial cleanup plan is displayed in the attached ArcView shape file (Cleanup_fnl_v2.shp) and will be refined prior to the data gap cleanup event.*

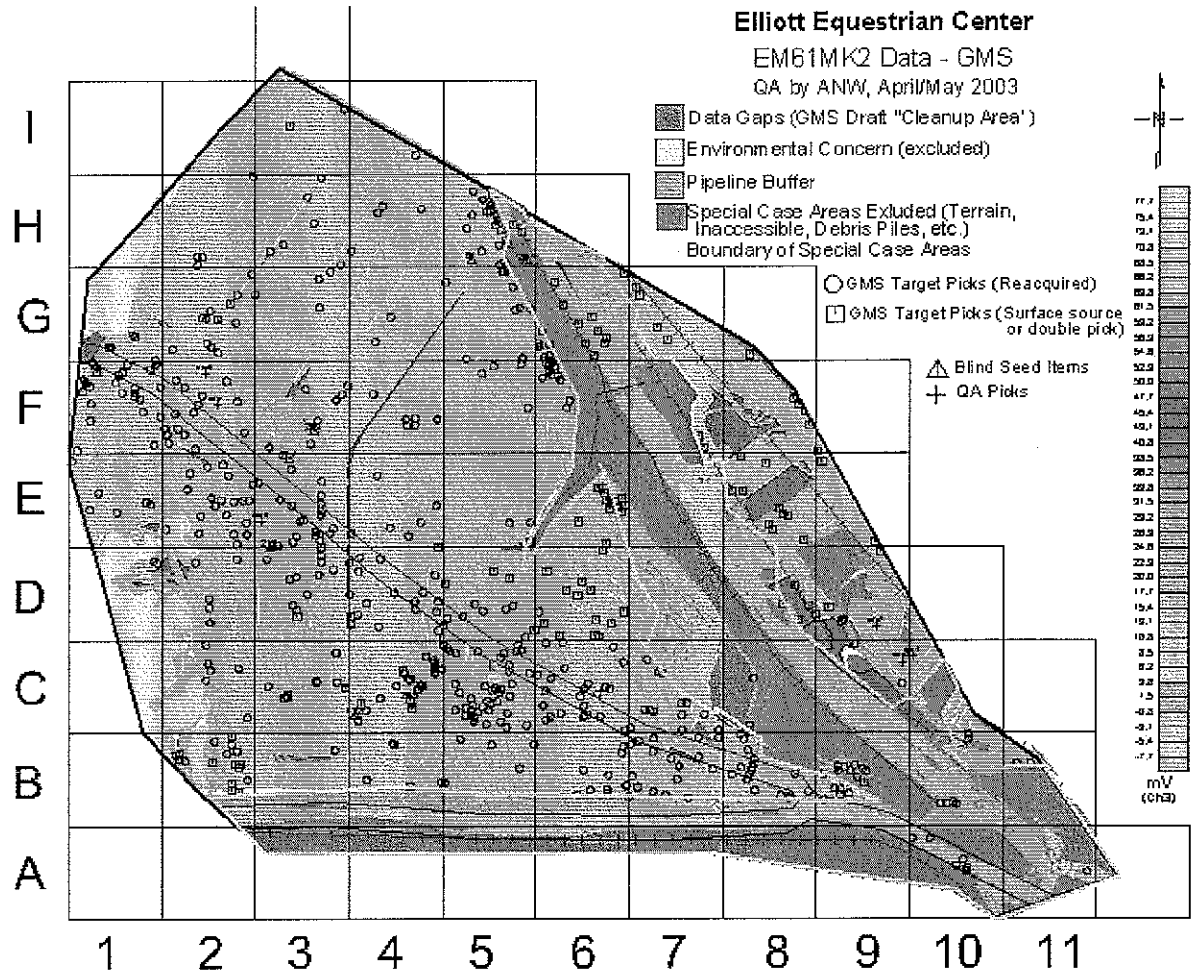

Figure 5: Updated Geophysical Data Map (with new shape files from GMS) – Data collected inside the Special Case and Pipeline Buffer Areas has been brought to the front of the map and is bounded by the light blue polygon. See section 2 5 for discussion of anomalies within this area.

The initial Cleanup Plan (red areas) does not address all of the data gaps due to increased lane spacing. It is the author's opinion that all of the red areas should be geophysically mapped and all target anomalies dug. In addition, all areas where the lane spacing exceeds 3 feet should be filled in. The original lane spacing of 2.5 feet was used to ensure that full coverage was obtained, giving some room for error in positioning and some coil overlap. Because of the physics and operation of the EM61 instrument, the detecting capabilities are focused inside the coil, with significantly decreased detection outside of the coil. This is especially important for small target items such as 37mms. Therefore, any lines whose across-lane spacing exceeds 3 feet (the width of the EM61 coil) should be filled in with additional geophysical data.

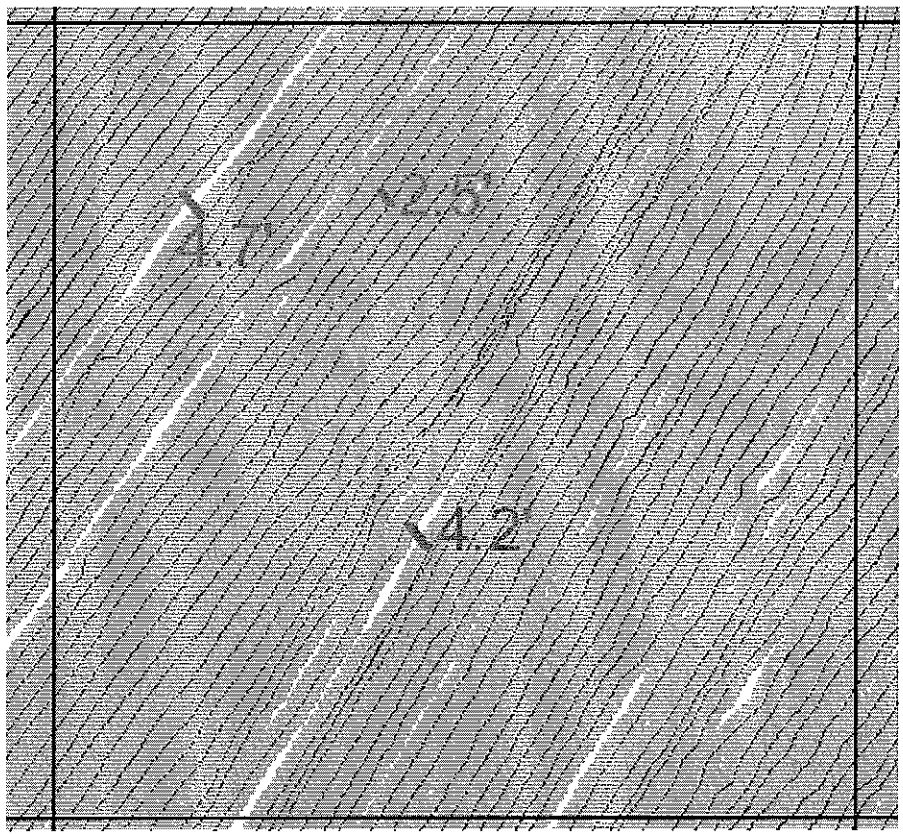

Figure 6: Data Map Showing Example Lane Spacing

2.4 Survey Area Pre-Seeded Items

Several Government blind seed items were buried in the proposed survey area (see Table 1). A handheld GPS unit was used for positioning the seed items. Because of the errors in positioning using a handheld GPS, it is impossible to determine if the contractor has detected and selected the blind seed items prior to digging. There are multiple target picks within the estimated positioning error for each seed item, which will be excavated and compared to the list of seed items.

Additional blind seed items will be buried in the "clean-up" area before mapping takes place. The positioning error of these items will be within 1 foot

Item #	Description	Grid Coordinates (UTM)		EPE	Depth	Orientation
		Easting	Northing			
265	75mm	0497144	3634247	17'	2"	horiz-N/S
219	75mm	0497098	3634297	17'	9"	horiz-N/S
269	75mm	0497112	3634335	18'	9"	nose up
267	75mm	0497181	3634391	18'	11"	nose up
061	37mm	0497163	3634391	18'	13"	horiz-E/W
127	37mm	0497104	3634326	18'	5"	nose up
048	37mm	0497041	3634354	18'	10"	nose up
122	37mm	0497126	3634242	14'	5"	horiz-N/S

*EPE= estimated positioning error

Table 1 Blind Seed Items

2.5 Target Dig List

The target list provided by the contractor was reviewed, with dig locations posted to the Geosoft map. These targets have been reacquired and marked with a wooden hub, one foot north of each reacquired dig location. Upon Government review of the target dig list, it was determined that a large number of targets were not reacquired. An Interim QA Report was sent to the project PM by email on May 16, 2003 including this concern. The following is the comment addressed in the interim QAR, and the resolution received on May 18, 2003:

***QA Comment*:** The target list shows ~19% of the targets as not reacquired, and some of these are large amplitude responses. I believe that they are probably due to surface/cultural features or picking multiple targets for one anomaly. However, there are no notes on the target spreadsheet to explain why they were not reacquired. Please have GMS send any additional documentation that they have to explain the high false positive rate.

Response from GMS: *The target spreadsheet provided as a part of the original submission (Draft Equestrian Target List.xls) has been amended (Draft Equestrian Target List v3 xls) to better explain the list. See notes at the end of the spreadsheet for explanation of fields.*

During reacquisition, a number of the double targets and surface debris were resolved. In most cases, repeat targets were a result of the merging of multiple target databases and were rectified during the visual/reacquisition process. The total number of actual targets marked during the reacquisition was 455.

During reacquisition, the USACE Safety Specialist requested that the targets only be marked with a spray painted hub, to denote the subsurface target as ferrous or

non-ferrous and not mark with a numbered stake. This was requested due to the long time period between field seasons and the probable curiosity of park patrons.

Many of the selected targets are small amplitude, and some appear to be very close to the noise level which will likely lead to a high false positive rate and the recovery of large amounts of small scrap metal. However, because of the small response to the potential UXO items noted in the test strip data, recommend digging all reacquired anomalies.

There are a few anomalies that were reacquired that should not be dug. First, anomaly number 95181 appears to be on the edge of an environmental concern area, and thus should be avoided. Additionally, some appear to be caused by a culvert beneath the road (in Grid B8). Recommend removing the following anomalies from the dig sheet: 95181, 9197, 9177, 9176, 9163, 9150, and 9195.

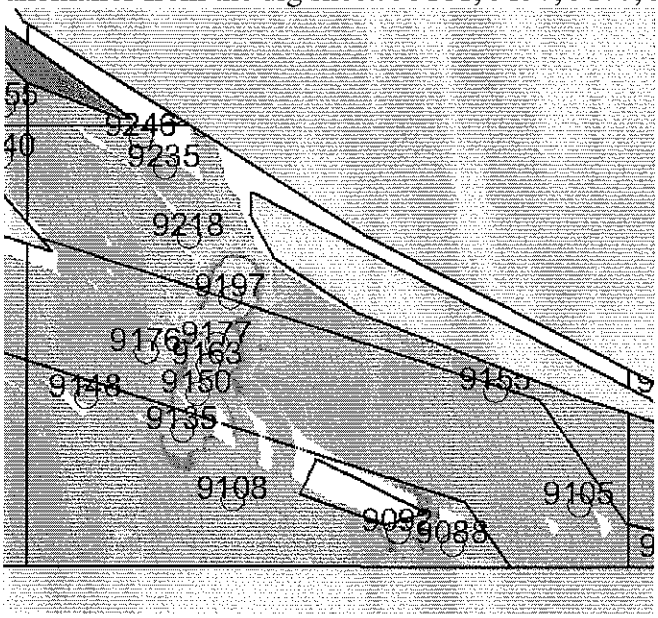

Figure 7: Suspected culvert causing anomalies

In addition to the targets selected and reacquired by the contractor, the government has made the following QA target picks. These targets should be reacquired and dug if no surface or cultural cause is detected.

Item #	Grid Coordinates (State Plane)		Grid
	Easting	Northing	
coe1	6321740.8	1888914.2	F2
coe2	6322445.8	1888675.8	D9
coe3	6322473.6	1888637.3	C9
coe4	6322484.3	1888643.6	C10
coe5	6321728.3	1888947.1	F2
coe6	6321787.0	1888789.5	E3

Table 2 QA Dig List

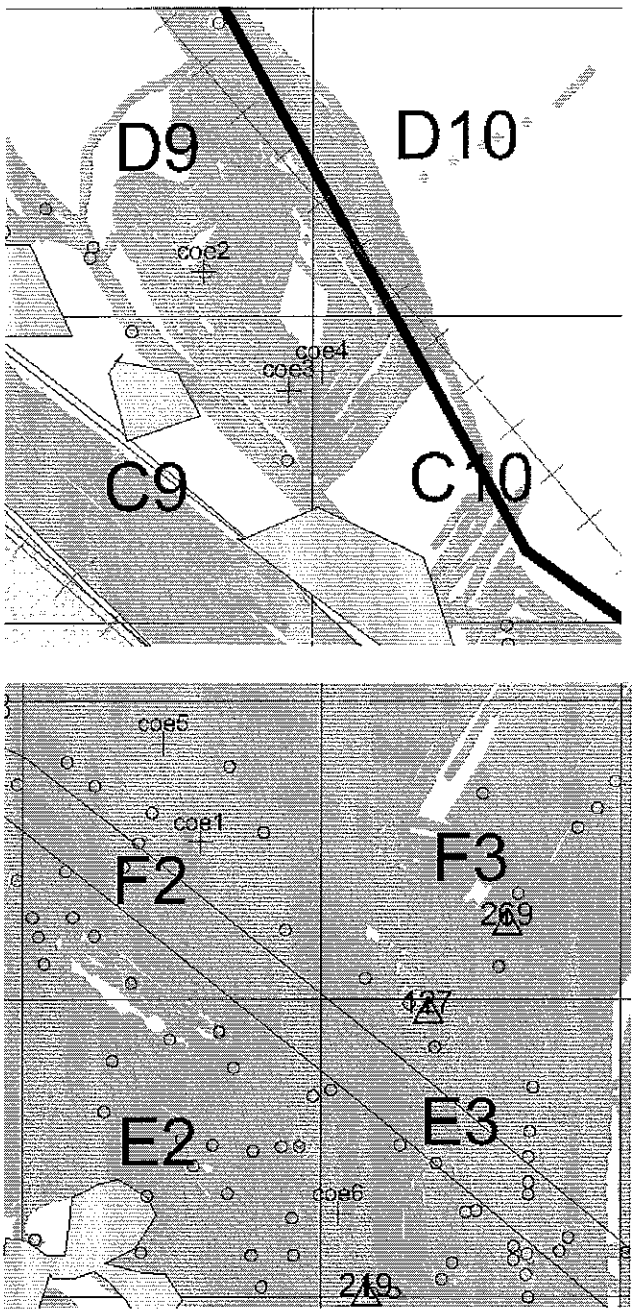

Figure 8: QA Digs (shown by crosses)

In addition to the individual target picks, it is the government's belief that the anomalies evident in the geophysical data acquired within the special case areas (light blue polygon in Figure 5) be further analyzed. Some of them are obviously due to cultural features, such as the linear trend cutting across grid G-6 and in line with the fence, and the anomalies along the pipeline. The others are probably due to surface clutter in the "debris pile" and "road exclusion" areas; however, we cannot be certain based on the

information provided. The target list should be revised to include these additional anomalies (or at least a sampling of them) to ascertain their cause. If the contractor has any additional data from field notes to explain these anomalies, this should be notated on their map.

3.0 Quality Assurance Audit Summary and Recommendations

It is anticipated that the contractor will be successful in meeting all of the Quality Assurance elements when the "cleanup" data is acquired and processed. The geophysical data collected with the EM61-MK2 was of high quality, noise levels and navigation were satisfactory, the documentation is excellent, and all comments relayed to the contractor in the interim QA report were addressed to the author's satisfaction. It is the professional opinion of the author that the geophysical data are adequate to meet the project objectives and effectively locate buried UXO for removal (provided that the data gaps are addressed).

It is the recommendation of the author that the following steps be taken:

(1) GMS provides a final "cleanup" plan for review, then maps and processes the data gaps, and addresses any detected anomalies. This includes all data gaps where the lane spacing is greater than 3 feet.

(2) GMS provides an updated target list including the QA picks and excluding 95181, 9197, 9177, 9176, 9163, 9150, and 9195 (as discussed in the previous section). This updated target list should also include anomalies for investigation in the area outlined in blue in Figure 5.

(3) All selected targets should be dug to ensure that the project area has been cleared to the best of our capabilities.

This QA Audit Report will be finalized after the additional mapping has been accomplished, and the dig results analyzed.